

**Claims:**

1. For use with a demand forecast application capable of traversing a demand forecast tree having at least one node with a time series of sales values associated therewith representing the sales of a perishable consumer item at an outlet over an observation period, a computer implemented method for calculating the hidden demand for the perishable consumer item at the outlet at an occurrence of a sellout, the method comprising the steps of:

(a) generating a new data set of sales values from the time series of sales values for the perishable consumer item at the outlet, the new set of sales values excluding the truncated sales value at at least the occurrence of the sellout;

(b) applying a statistical seasonal causal time series forecasting model of count data on the new data set of sales values to determine a forecasted mean demand value for the perishable consumer item at the outlet at the occurrence of the sellout; and

(c) estimating the hidden demand at the occurrence of the sellout using a single parameter probability distribution with a parameter assuming the forecasted mean demand value.

2. The method according to claim 1 wherein the single parameter probability distribution is Poisson with a parameter  $\lambda$  assuming the forecasted mean demand value whereby:

$$H = \lambda \left( 1 + \frac{f(D)}{1 - F(D)} \right) - D$$

where  $f(\cdot)$  is the Poisson probability distribution function, and  $F(\cdot)$  is the Poisson cumulative distribution function, and  $D$  is the draw of the perishable consumer item leading up to the occurrence of the sellout.

3. The method according to claim 1 wherein the new data set of sales values excludes the truncated sales values at all occurrences of sellouts over the observation period.

30

4. The method according to claim 1 and further comprising the step (d) of:

calculating the value of at least one performance metric on the basis of adjusted sales data compensating for hidden demand at occurrences of sellouts over an evaluation period.

5     5.     The method according to claim 4 wherein the step (d) includes calculating the total stockout for the perishable consumer item at the outlet over the evaluation period for evaluating the efficacy of a distribution policy for the perishable consumer item at the outlet over the evaluation period.

10     6.     The method according to claim 4 wherein the step (d) includes calculating the value of at least one performance metric relating to the sale of the perishable consumer item at the outlet which could be expected to occur over the evaluation period by virtue of the perishable consumer item being delivered in accordance with a recommended distribution policy as opposed to an actual distribution policy for comparing the  
15     efficacy of the recommended distribution policy to the efficacy of the actual distribution policy over the evaluation period.

20     7.     The method according to claim 6 wherein the step (d) includes calculating the value of at least one performance metric from the following list of performance metrics:  
change in sales, change in returns, change in number of sellouts, and change in stockout.

25     8.     The method according to claim 1 wherein the perishable consumer item is a printed media publication.

30     9.     For use with a demand forecast application capable of traversing a demand forecast tree having at least one node with a time series of sales values associated therewith representing the sales of a perishable consumer item at an outlet over an observation period, a computer implemented system for calculating the hidden demand for the perishable consumer item at the outlet at an occurrence of a sellout, the system capable of executing the steps of:

- 15 -

- (a) generating a new data set of sales values from the time series of sales values for the perishable consumer item at the outlet, the new set of sales values excluding the truncated sales value at at least the occurrence of the sellout;
- (b) applying a statistical seasonal causal time series forecasting model of count data on the new data set of sales values to determine a forecasted mean demand value for the perishable consumer item at the outlet at the occurrence of the sellout; and
- (c) estimating the hidden demand at the occurrence of the sellout using a single parameter probability distribution with a parameter assuming the forecasted mean demand value.

10

10. The system according to claim 9 wherein the single parameter conditional probability distribution is Poisson with a parameter  $\lambda$  assuming the forecasted mean demand value whereby:

$$H = \lambda \left( 1 + \frac{f(D)}{1 - F(D)} \right) - D$$

15

where  $f(\cdot)$  is the Poisson probability distribution function, and  $F(\cdot)$  is the Poisson cumulative distribution function, and  $D$  is the draw of the perishable consumer item leading up to the occurrence of the sellout.

20

11. The system according to claim 9 wherein the new data set of sales values excludes the truncated sales values at all occurrences of sellouts over the observation period.

25

12. The system according to claim 9 and further capable of executing the step (d) of:

calculating the value of at least one performance metric on the basis of adjusted sales data compensating for hidden demand at occurrences of sellouts over an evaluation period.

30

13. The system according to claim 12 wherein the step (d) includes calculating the total stockout for the perishable consumer item at the outlet over the evaluation period

2025-03-19 10:55:45

for evaluating the efficacy of a distribution policy for the perishable consumer item at the outlet over the evaluation period.

14. The system according to claim 12 wherein the step (d) includes calculating the value of at least one performance metric relating to the sale of the perishable consumer item at the outlet which could be expected to occur over the evaluation period by virtue of the perishable consumer item being delivered to the outlet in accordance with a recommended distribution policy as opposed to an actual distribution policy for comparing the efficacy of the recommended distribution policy to the efficacy of the actual distribution policy over the evaluation period.

15. The system according to claim 13 wherein the step (d) includes calculating the value of at least one performance metric from the following list of performance metrics: change in sales, change in returns, change in number of sellouts, and change in stockout.

16. The system according to claim 9 wherein the perishable consumer item is a printed media publication.

17. For use with a demand forecast application capable of traversing a demand forecast tree having at least one node with a time series of sales values associated therewith representing the sales of a perishable consumer item at an outlet over an observation period, a computer implemented method for evaluating the efficacy of a distribution policy for the consumer item at the outlet over an evaluation period, the method comprising the steps of:

(a) estimating the hidden demand at one or more occurrences of sellouts occurring during the evaluation period; and

(b) calculating the value of at least one performance metric on the basis of adjusted sales data compensating for the hidden demand at occurrences of sellouts over the evaluation period.

5 18. The method according to claim 17 wherein the step (b) includes calculating the total stockout for the perishable consumer item at the outlet over the evaluation period.

10 19. The method according to claim 17 wherein the step (b) includes calculating the value of at least one performance metric relating to the sale of the perishable consumer item at the outlet which could be expected to occur over the evaluation period by virtue of the perishable consumer item being delivered in accordance with a recommended distribution policy as opposed to an actual distribution policy for comparing the efficacy of the recommended distribution policy for the perishable consumer item at the outlet to the efficacy of the actual distribution policy for the perishable consumer item at the  
15 outlet.

20 20. The method according to claim 19 wherein the step (b) includes calculating the value of at least one performance metric from the following list of performance metrics: change in sales, change in returns, change in number of sellouts, and change in stockout.

21. The method according to claim 17 wherein the step (a) includes the steps of:  
(a1) generating a new data set of sales values from the time series of sales values for the perishable consumer item at the outlet, the new set of sales values excluding the  
25 truncated sales value(s) at one or more occurrences of sellout during the evaluation period;  
(a2) applying a statistical seasonal causal time series forecasting model of count data on the new data set of sales values to determine a forecasted mean demand value for the perishable consumer item at the outlet at the occurrence of a sellout; and

(a3) estimating the hidden demand at the occurrence of the sellout using a single parameter probability distribution with a parameter assuming the forecasted mean demand value.

- 5 22. The method according to claim 21 wherein the single parameter conditional probability distribution is Poisson with a parameter  $\lambda$  assuming the forecasted mean demand value whereby:

$$H = \lambda \left( 1 + \frac{f(D)}{1 - F(D)} \right) - D$$

10 where  $f(\cdot)$  is the Poisson probability distribution function, and  $F(\cdot)$  is the Poisson cumulative distribution function, and  $D$  is the draw of the perishable consumer item leading up to the occurrence of the sellout.

- 15 23. The method according to claim 21 wherein the new data set of sales values excludes the truncated sales values at all occurrences of sellouts over the observation period.

24. The method according to claim 17 wherein the perishable consumer item is a printed media publication.

- 20 25. For use with a demand forecast application capable of traversing a demand forecast tree having at least one node with a time series of sales values associated therewith representing the sales of a perishable consumer item at an outlet over an observation period, a computer implemented system for evaluating the efficacy of a distribution policy for the consumer item at the outlet over an evaluation period, the  
25 system capable of executing the steps of:

- (a) estimating the hidden demand at one or more occurrences of sellouts over the evaluation period; and  
(b) calculating the value of at least one performance metric on the basis of adjusted sales data compensating for the hidden demand at occurrences of sellouts over the  
30 evaluation period.

26. The system according to claim 25 wherein the step (b) includes calculating the total stockout for the perishable consumer item at the outlet over the evaluation period.

5 27. The system according to claim 25 wherein the step (b) includes calculating the value of at least one performance metric relating to the sale of the perishable consumer item at the outlet which could be expected to occur over the evaluation period by virtue of the perishable consumer item being delivered in accordance with a recommended distribution policy as opposed to an actual distribution policy for comparing the efficacy  
10 of the recommended distribution policy for the perishable consumer item at the outlet to the efficacy of the actual distribution policy for the perishable consumer item at the outlet.

28. The system according to claim 27 wherein the step (b) includes calculating the  
15 value of at least one performance metric from the following list of performance metrics: change in sales, change in returns, change in number of sellouts, and change in stockout.

29. The system according to claim 25 wherein the step (a) includes the steps of:  
(a1) generating a new data set of sales values from the time series of sales values for  
20 the perishable consumer item at the outlet, the new set of sales values excluding the truncated sales values at one or more occurrences of sellout during the observation period;  
(a2) applying a statistical seasonal causal time series forecasting model of count data on the new data set of sales values to determine a forecasted mean demand value for the  
25 perishable consumer item at the outlet at the occurrence of a sellout; and  
(a3) estimating the hidden demand at the occurrence of the sellout using a single parameter probability distribution with a parameter assuming the forecasted mean demand value.

2025-09-19 15:03:49

30. The system according to claim 29 wherein the single parameter conditional probability distribution is Poisson with a parameter  $\lambda$  assuming the forecasted mean demand value whereby:

$$H = \lambda \left( 1 + \frac{f(D)}{1 - F(D)} \right) - D$$

5 where  $f(\cdot)$  is the Poisson probability distribution function, and  $F(\cdot)$  is the Poisson cumulative distribution function, and  $D$  is the draw of the perishable consumer item leading up to the occurrence of the sellout.

31. The system according to claim 29 wherein the new data set of sales values  
10 excludes all the truncated sales values at all occurrences of sellouts over the observation period.

32. The system according to claim 25 wherein the perishable consumer item is a  
15 printed media publication.

2025 RELEASE UNDER E.O. 14176